

DOCUMENT RESUME

ED 251 707

CE 040 380

AUTHOR Plummer, Nancy; Michael, Nancy, Ed.
TITLE Medications Used in the Treatment of Ischemic Heart Disease.
INSTITUTION Indiana Univ., Bloomington. Vocational Education Services.
SPONS AGENCY Indiana State Dept. of Public Instruction, Indianapolis. Div. of Vocational Education.
PUB DATE 83
NOTE 19p.; For related documents, see ED 236 440 and CE 040 378-387.
AVAILABLE FROM Vocational Education Services, 840 State Road 46 Bypass, Bloomington, IN 47405.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)
EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Allied Health Occupations Education; Allied Health Personnel; Behavioral Objectives; Cardiovascular System; *Continuing Education; *Drug Therapy; Drug Use; *Heart Disorders; *Inservice Education; Learning Activities; Medical Services; Medical Vocabulary; Nurses; Nurses Aides; Nursing Education; *Nursing Homes; Residential Care
IDENTIFIERS *Ischemic Heart Disease

ABSTRACT

This module on medications used in the treatment of ischemic heart disease is intended for use in inservice or continuing education programs for persons who administer medications in long-term care facilities. Instructor information, including teaching suggestions, and a listing of recommended audiovisual materials and their sources appear first. The module goal and objectives are then provided. A brief discussion follows of the structure and function of the heart, including a diagram; the pathophysiology of cardiac ischemia, including angina pectoris and myocardial infarction; and considerations and suggestions for patient care. This discussion is intended for use as a lecture or participant reading. Other contents include a vocabulary list, a worksheet, and drug charts, all of which are suitable for reproduction for use as handouts. (YLB)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED251707

MEDICATIONS USED in the TREATMENT of ISCHEMIC HEART DISEASE

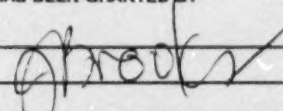
IN 5/3/01

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

✓ This document has been reproduced as
received from the person or organization
originating it.
Minor changes have been made to improve
reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS
MATERIAL IN MICROFICHE ONLY
HAS BEEN GRANTED BY



TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

Written by:
Nancy Plummer, R.N.
Consultant for the Medication Aide Program
State of Indiana

For additional information on the material:
Division of Vocational Education
3833 North Meridian
Indianapolis, Indiana 46204

Edited by:
Nancy Michael

Published by:
Vocational Education Services
840 State Road 46 Bypass, Room 111
Indiana University
Bloomington, Indiana 47405

SBVTE project number: 325-82-3-1

Copyright 1983

Permission is granted classroom instructors to xerox pages for classroom use only.

Medications Used in the Treatment of Ischemic Heart Disease

Instructor Information

This material is intended for inservice or continuing education programs for persons who administer medications in a long term care facility. It includes:

- A brief review of the structure and function of the heart, including a diagram.
- A brief discussion of the pathophysiology of cardiac ischemia, including angina pectoris and myocardial infarction.
- Considerations and suggestions for patient care.
- Drug charts which can be duplicated and used as handouts.
- A vocabulary list.
- A worksheet to be completed by participants.

Audio/Visual Materials

The following film strips and audio tapes are available on loan from Vocational Education Services, 840 State Road 46 Bypass, Room 111, Indiana University, Bloomington, Indiana 47405:

Coronary Artery Disease: Angina Pectoris and Myocardial Infarction AV070034

Cardiopulmonary Resuscitation AV070011

A useful booklet entitled "You and Your Heart" is available from the Indiana State Board of Health, 1330 W. Michigan, P.O. Box 1964, Indianapolis, Indiana 46206.

Medications Used in Treatment of Ischemic Heart Disease

Goal

The most frequent cause of death in the elderly is disease of the blood vessels which supply the heart. This module is intended to provide the person who administers medications with information regarding ischemic heart diseases, pathology and symptomatology, and medications used in treatment of those diseases.

Objectives

After completing this module, the participant will be able to:

- Describe the coronary blood supply.
 - Describe the pathophysiology of angina pectoris and myocardial infarction.
 - List 3 classifications of drugs used in the treatment of angina pectoris; their actions and side effects.
 - Discuss considerations for care of the patient with angina pectoris.
 - Describe the actions to be taken when a patient is suspected of having a myocardial infarction.
-

Ischemic Heart Disease; Associated Medications and Patient Care

Structure and Function of the Heart

The Heart Functions as a Pump

Alternately contracting and relaxing, the heart fills with blood during relaxation (*diastole*). During contraction (*systole*) it pumps blood from the ventricle to the lungs where the blood receives oxygen and gives off carbon dioxide. From the left ventricle, through the aorta, the oxygenated blood is delivered to the body. Contraction is actually a milking movement; the atria contract first, emptying blood into the ventricles, then ventricular contraction sends blood to the lungs and the rest of the body.

The Heart is a Four-Chambered Muscular Pump

Blood enters the right atrium from the vena cava laden with carbon dioxide and with low oxygen content. The fluid passes through the tricuspid valve when the atria contract and into the right ventricle. With ventricular contraction, blood moves through the pulmonary artery into the lung tissue where it receives oxygen and gives up carbon dioxide. The oxygenated blood re-enters the heart through the pulmonary vein into the left atrium. When the atria contract, oxygenated blood is forced through the mitral valve into the left ventricle. Then ventricular contraction pushes blood through the aortic valve into the aorta and all parts of the body.

The Heart Muscle Receives Its Blood Supply Through the Coronary Circulation

The right and left coronary arteries branch from the aorta just above the aortic valve. The left coronary artery divides into two main branches, the anterior descending artery and the circumflex artery which supply the front side of the heart. The right coronary artery has one small anterior branch (the marginal artery); its major branches supply the back side of the heart. Venous blood from the coronary system returns to the systemic system through the coronary veins which empty into the coronary sinus in the right atrium. Blood flows through the coronary system only during diastole.

Regulation of Heart Rate and Rhythm

The heart contains its own system of specialized muscles which initiate and maintain the contraction of the entire heart muscle. When the heart works normally, the contraction is initiated in the S-A node, a small mass of tissue at the back of the right atrium.

This electrical stimulus spreads across the atria and reaches the A-V node, another mass of specialized tissue in the wall between the atria close to the opening of the coronary sinus. The impulse travels down the A-V bundle into the wall between the ventricles where the bundle branches into left and right. The impulse and the contraction it stimulates spread through the ventricles. If disease blocks the transmission of the impulse, a stimulus may arise from some other area of tissue and produce an ectopic beat. The electrical stimulus is transmitted through calcium and potassium in the cells of the heart muscle. Changes in the amount of calcium or potassium in the body can seriously affect the heart rate.

Pathophysiology of Ischemic Heart Disease

Ischemia Means Inadequate Blood Supply

Cardiac ischemia may be caused by:

- Arteriosclerosis — thickening of artery walls and loss of elasticity
- Atherosclerosis — narrowing of artery walls due to cholesterol deposits on the artery lining
- Anemia
- Tachycardia

Ischemia may be related to:

- Exertion
- Emotional stress
- Eating a heavy meal

Angina Pectoris Is Chest Pain Due to Cardiac Ischemia

Pain may:

- Be mild to severe
- Be vise-like, oppressive
- Radiate from chest to jaw or left arm
- Last from 3 to 15 minutes

Treatment of angina pectoris includes:

- Avoidance of overactivity
- Avoidance of smoking
- Weight reduction
- Regular exercise program, remaining below the pain threshold
- Drug therapy with:
 - Nitroglycerine
 - Amyl-Nitrate
 - Calcium blockers
 - Beta — adrenergic blocking agent

Myocardial Infarction (MI) Is Death of an Area of Heart Muscle due to lack of blood supply caused by occlusion of a coronary artery or one of its branches.

Persons with atherosclerosis are more likely to have an MI.

Signs and symptoms include:

- Chest pain — severe, crushing, often radiating, not relieved by rest or nitrites
- Dyspnea
- Pallor or cyanosis
- Perspiration, clammy skin
- Apprehension, fear

Sometimes patients do not have symptoms — "silent coronary."

Amount of heart damage determines severity of symptoms and degree of recovery.

Drugs Administered for Angina Pectoris

PRN Medications for Acute Pain — Dilate Blood Vessels

Nitroglycerin

May be sublingual tablets 1/100-1/400 grain

- Dissolve under tongue — do not swallow
- Repeat every 10 minutes x 3 doses if needed
- May be taken before anticipated exertion or stress
- Patient should lie down after taking nitroglycerin — may cause orthostatic hypotension
- May cause headache, dizziness, flushing, tachycardia
- Tablets lose strength when exposed to light, heat or moisture or are out-dated

May be ointment

- Usual dose is 1-2 inches
- Spread thin layer on nonhairy area of skin — do not rub in
- Cover with plastic wrap to aid absorption and protect clothing

Amyl nitrite

- Available in ampules for inhalation
- Wrap ampule in cloth and hold near patient's nose
- Keep away from open flame
- May cause headache, flushing, tachycardia, dizziness
- Effective in a few seconds but lasts only 5-10 minutes

Drugs to Prevent or Lessen Angina Attacks

Long acting vasodilators — dilate blood vessels

- Examples are:
 - isoxsuprine (Vasodilan)
 - isosorbide dinitrate (Sorbitrate, Isordil)
 - nitroglycerin (Nitrobid, Nitrospan)
 - papaverine (Cerespan, Pavacen, Pavabid)
- Administered routinely
- May cause dizziness, nervousness, hypotension, tachycardia, palpitations
- Vasodilators improve blood supply to the heart muscle by dilating blood vessels

Beta-adrenergic blocking agents — slow heart rate and decrease oxygen requirements of the heart muscle; lower systolic and diastolic blood pressure

- Examples
 propranolol (Inderal)
 nadolol (Corgard)
- Side effects include: depression, insomnia, fatigue, hypotension, bradycardia, visual disturbances, nausea, vomiting, diarrhea, constipation
- Check apical pulse before administering, withhold if extremely high or low and notify physician
- Suddenly discontinuing drug may cause increase of angina
- Watch for signs of congestive failure: edema, orthopnea, night cough

Calcium channel blockers (calcium antagonists) — increase blood flow and oxygen supply to heart muscle by reducing constriction of heart muscle cells; also reduce peripheral vascular resistance and help to establish regular heart rhythm

- Examples
 nifedipine (Procardia)
 verapamil (Calan, Isoptin)
- May cause hypotension, dizziness, flushing and palpitations
- May potentiate digoxin

Vocabulary

Ischemia — inadequate blood supply

Arteriosclerosis — thickening of artery walls and loss of elasticity

Atherosclerosis — narrowing of artery walls due to cholesterol deposits on the artery lining

Dyspnea — difficult breathing

Orthopnea — inability to breathe except in an upright position

Tachycardia — rapid heart rate

Bradycardia — slow heart rate

Potentiate — increase the effect

Infarct — death of an area of tissue due to interruption of blood supply

Considerations for Care of the Patient with Angina Pectoris

Considerations	Suggestions
Exertion predisposes to pain.	Encourage activity which is within the patient's ability for short periods.
Eating a heavy meal predisposes the patient to pain.	Stop physical activity if pain occurs. Encourage patient to eat frequent small meals.
Emotion predisposes one to pain.	Be alert to the patient's emotional condition.
Smoking contributes to cardiac ischemia.	Encourage patient to avoid smoking.
Excess weight increases work for the heart.	Encourage patient to maintain normal body weight.
Medication may lessen angina pain.	Leave nitroglycerin at bedside if ordered by physician. Encourage patient to take medication as ordered.

Actions to Take When Myocardial Infarction Is Suspected

Considerations	Suggestions
If chest pain is severe and long lasting, MI must be considered.	If patient has angina pectoris and nitroglycerin is ordered, it should be administered — one tablet every 10 minutes x 3 doses.
If pain persists, physician should be advised.	Report apical pulse rate, respirations, and blood pressure. Look for cyanosis, perspiration, apprehension.
Patient may have extreme pain.	Administer analgesic if ordered by physician.
Patient may be very apprehensive.	Have someone remain with patient. Reassure patient that you are taking action.
Damage to heart muscle will cause hypoxia.	Be prepared to administer oxygen if ordered by physician. Elevate head of bed.
Immediate emergency care may save the patient's life.	Be prepared to transport the patient to the hospital with little delay. Send accurate record of drugs administered, in addition to routine data.

Worksheet

1. Cardiac ischemia might be caused by:

1. 2.

3. 4.

2. Treatment of angina pectoris might include:

1. 2.

3. 4.

3. Important observations to make and report on a patient suspected of having a myocardial infarction are:

1. 2. 3.

4. 5. 6.

4. Three classifications of medications which are used to prevent or lessen angina attacks are:

1.

2.

3.

5. Why do you think nitroglycerin tablets ordered for PRN treatment of angina pectoris would be left at the bedside? _____

6. If a patient with severe chest pain is very apprehensive you might:

1. 2.

7. The heart muscle receives its blood supply through what arteries?

8. Why should a patient lie down after taking a sublingual nitroglycerin tablet?

9. Nifedipine and verapamil may potentiate digoxin. This means that

10. Infarct means _____

11. If a patient cannot breathe when he lies flat in bed he has _____

12. A rapid pulse rate is called _____

Antianginal Medications

Medications administered for acute pain – induce vascular relaxation

Vasodilators – dilate blood vessels

Drug	Side Effects	Interacts With	To Produce	Remember
Nitroglycerin Nitroglycerin (Sublingual) Nitrostat (Sublingual) Nitro-bid (Topical) Nitrol (Topical)	Dizziness Headache Flushing Weakness Postural hypotension			Excessive dosage will cause violent headache. Overdose may cause paralysis, convulsions. Avoid alcohol. Protect medication from heat, light, moisture; check expiration date. Repeat dosage every 10 minutes x 3 if not effective; then notify physician if no relief of pain. Effective in 3 minutes, lasts 10-30 minutes.
Amyl Nitrite Amyl Nitrite (Inhalant)	Dizziness Headache Flushing			Wrap ampule in cloth and hold near patient's nose. Keep away from open flame. Effective in 30 seconds, lasts 3-5 minutes.

Medications administered to prevent or lessen attacks
Long acting vasodilators – dilate blood vessels

Drug	Side Effects	Interacts with	To Produce	Remember
Isosuprine Vasodil Vasoprine	Dizziness Weakness Hypotension Tachycardia Vomiting Rash	None significant		Observe for hypotension. Tell patient to take medication regularly.
Isorbide dinitrate Isordil Sorbitrate Angidil	Headache Dizziness Weakness Hypotension Vomiting Flushing	None significant		Available in sublingual, chewable, oral forms. Tell patient to take medication regularly. Observe for hypotension. Avoid alcohol. Take oral form on empty stomach.
Nitroglycerin Nitrobid Nitrospan Nitrol	Headache Weakness Dizziness Orthostatic hypotension Flushing Nausea Vomiting	None significant		Available in sustained release capsule, ointment, sublingual tablets.
Papaverine Cerespan Pavabid	Headache Tachycardia Hypertension Constipation Perspiration Flushing	None significant		Monitor BP, heart rate and rhythm. Long term therapy is required.

Antianginal Medications

Medications administered to prevent or lessen attacks

Beta-adrenergic blocking agents – slow heart rate and decrease oxygen requirements, lower systolic and diastolic pressure

Drug	Side Effects	Interacts With	To Produce	Remember
Propranolol Inderal	Bradycardia Paresthesia of hands Depression Insomnia Memory loss Nausea Vomiting Rash Alopecia Bronchospasm	Insulin Hypoglycemics	Altered requirements for insulin and hypoglycemics	Medication should not be discontinued suddenly. Check apical pulse before giving; hold if extreme. Monitor blood pressure. Avoid alcohol. Give with meals. May cause orthostatic hypotension.
		Cardiac glycosides	Bradycardia	
		Aminophylline	Diminished effect of propranolol	
Nadolol Corgard	Bradycardia Hypotension Dizziness Fatigue Nausea Vomiting Diarrhea Rash Headache Sweating Depression	Insulin Hypoglycemics	Altered requirements for insulin and hypoglycemics	Medication should not be discontinued suddenly. Watch for signs of heart failure; edema, cough, dyspnea. Use with caution in persons with bronchospastic disease.

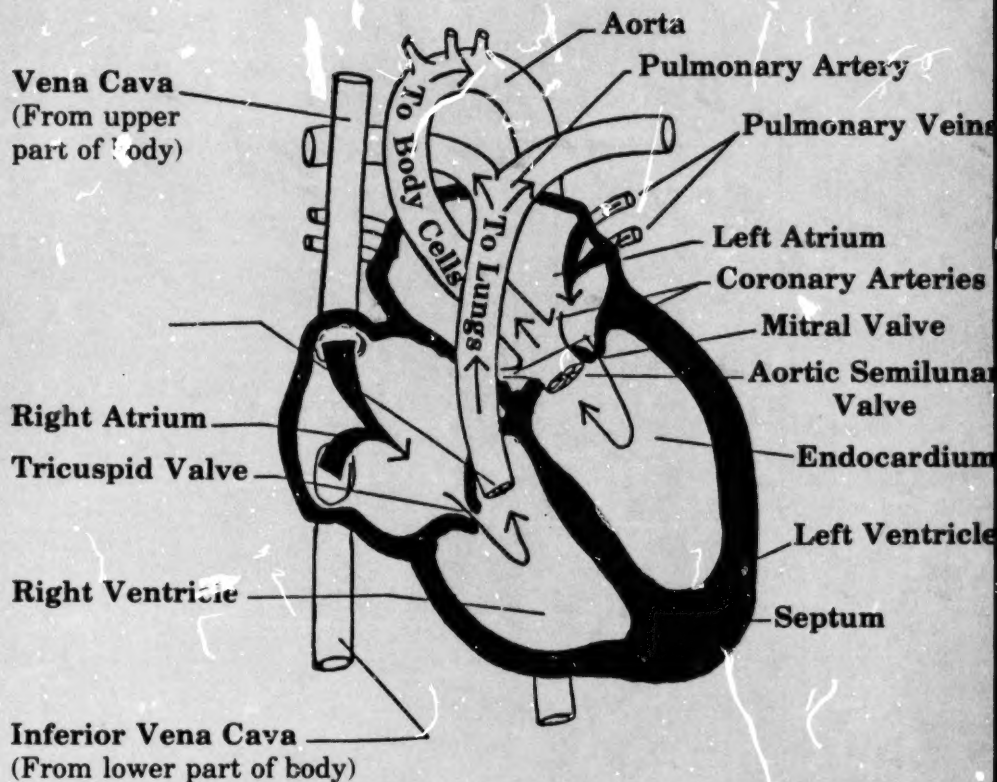
Antianginal Medications

Medications administered to prevent or lessen attacks

Calcium Channel Blockers (Calcium Antagonists)—reduce constriction of heart muscle and increase blood supply; reduce peripheral vascular resistance; help to establish regular heart rhythm

Drug	Side Effects	Interacts With	To Produce	Remember
Nifedipine Procardia	Hypotension Dizziness Flushing Palpitations Edema	Digoxin	Increased concentration of digoxin in the blood	May cause increased frequency of anginal attacks. Monitor heart rate and blood pressure.
		Beta-blockers (Inderal, Corgard)	Heart failure	
Verapamil Calan Isoptin	Bradycardia Constipation	Beta-blockers (Inderal, Corgard)	Impaired heart function	Patient should have periodic liver function tests. May interfere with SA node function and AV conduction. Monitor heart rate and blood pressure.
		Digoxin	Increased digoxin blood level	

The Heart



Function:
Pumps Blood through the Blood Vessels